

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference P70611PC00	FOR FURTHER ACTION		See Form PCT/PEA416
International application No. PCT/EP2005/005907	International filing date (day/month/year) 01.06.2005	Priority date (day/month/year) 16.08.2004	
International Patent Classification (IPC) or national classification and IPC INV. H04N1.62 G06T7/00 G06K9/00			
<p>Applicant FOTONATION VISION LIMITED et al.</p> <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains Indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 01.06.2006	Date of completion of this report 15.11.2006		
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	<p>Authorized officer Moorhouse, David Telephone No. +49 89 2399-8631</p> 		

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Box No. I Basis of the report

1. With regard to the **language**, this report is based on

- the international application in the language in which it was filed
- a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - international search (under Rules 12.3(a) and 23.1(b))
 - publication of the international application (under Rule 12.4(a))
 - international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report.*)

Description, Pages

1-16 as originally filed

Claims, Numbers

1-10 received on 06.06.2006 with letter of 01.06.2006

Drawings, Sheets

1/10-10/10 as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. The amendments have resulted in the cancellation of:

- the description, pages
- the claims, Nos.
- the drawings, sheets/figs
- the sequence listing (*specify*):
- any table(s) related to sequence listing (*specify*):

4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- the description, pages
- the claims, Nos.
- the drawings, sheets/figs
- the sequence listing (*specify*):
- any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-10
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-10
Industrial applicability (IA)	Yes: Claims	1-10
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

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Concerning Box V

The following documents are cited:

D1 : US-A-6 134 339
D2 : EP-A-1 429 290
D3 : WO-A-02/45003
D4 : US-A-5 751 836
D5 : WO-A-03/071484
D6 : US-B1-6 407 777

The subject-matter of claims 1 to 10 lacks an inventive step. Claims 1 to 10 therefore do not meet the requirement set out in Article 33 (3) PCT.

Document D1 discloses:

A digital image acquisition system (40) having no photographic film, comprising a portable apparatus (40) for capturing digital images (see Figure 4 and column 7, line 63 to column 8, line 5), a flash unit (12) for providing illumination during image capture, and a red-eye filter (26, 44) for detecting a region within a captured image indicative of a red-eye phenomenon, said detection being based upon a comparison of said captured image and a reference image of nominally the same scene taken without flash (see Figure 7, for example).

Document D2, in Figure 18 and paragraphs [0185] to [0196], discloses that it is desirable that the non-flash preview image is of a lower resolution. When comparing images of different resolutions, it is obvious to the skilled person that precautions be taken to take the difference into account. Upsampling and downsampling are well known in the image processing art. In this context, attention is drawn to the disclosure of document D3, Figure

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1 and page 4, lines 1 to 16, from which it is known to upsample and / or downsample images of different resolutions when processing them together.

The Applicant has argued that:

- a) up/downsampling are not needed according to paragraph [0193] of document D2; and
- b) document D3 relates to image synthesis and is thus not relevant to the claims.

These arguments cannot be accepted.

The paragraph of D2 referred to by the Applicant is silent as to up- or downsampling being carried out. This does not mean that it is not necessary. The IPEA remains of the opinion that it is such processes are well known in the art, and it is also well known that images of different resolutions cannot be compared unless one or both are converted to a common resolution.

The overall aim of document D3 may be to provide synthesized high resolution images. However, the passages cited by the IPEA relate to steps 110 and 120 of Figure 1 of D3 which are a precursor to step 130, which carries out "parametric motion estimation". Motion estimation requires comparison between images or regions thereof, and thus, in the context of steps 110 to 130 of Figure 1, document D3 does indeed relate to "comparison of image content".

The IPEA is thus of the opinion that the subject-matter of claim 1 is rendered obvious by the disclosure of document D1 combined with the disclosure of document D2, or by the disclosure of document D1 combined with the disclosures of documents D2 and D3.

The alignment of images which are to be compared is rendered obvious by the disclosure of document D4, column 9, line 53 to column 10, line 13. Thus, the additional feature of claim 2 is of no inventive significance.

It would be obvious to the skilled person reading document D1, that the red-eye processing be carried out if there are reasons to believe it may have occurred. Several example circumstances are listed in document D2. Moreover, it is known in the art to detect, if tests such as those in D2 failed, to check the image in question (see, for

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example, document D5, page 11, lines 12 to 14). It would thus be obvious to the skilled person to consider using the checks disclosed in document D5 prior to using the comparison process disclosed in document D1.

The additional features of claim 3 are thus rendered obvious by the disclosure of document D5.

Statistical detection of red-eye over a whole image or image region is known from document D1 - see column 10, lines 9 to 50 in particular.

Thus, the additional features of claim 4 are rendered obvious by the disclosure of document D1.

The additional features of claims 5 and 6 are rendered obvious by the disclosure of document D6 (see shape analyser 94 in Figure 1; Figures 2 to 7; step 230 in Figure 8; and column 5, lines 9 to 11).

The additional feature of claim 7 is also rendered obvious by the disclosure of document D1 (see column 7, lines 63 to 65).

The additional features of claims 8 and 9 are also rendered obvious by the disclosure of document D1 (see Figure 3 and column 6, line 46 to column 7, line 12 in particular).

The additional feature of claim 10 is obvious in view of the detection process disclosed in document D1. Moreover, red-eye correction after red-eye detection is rendered obvious by the disclosure of any of the documents D2 (see paragraph [0196] for example), D5 (see last step in loop in Figure 1) and D6 (see pixel modifier 96 in Figure 1; step 260 in Figure 8; and column 5, lines 24 to 28).

Concerning Box VII

The claims are not in the two-part form set out in Rule 6.3(b) PCT.

Reference signs as defined in Rule 6.2(b) PCT are absent from the claims.

Claims

1. A digital image acquisition system having no photographic film, comprising a portable apparatus for capturing digital images, a flash unit for providing illumination during image capture, and a red-eye filter for detecting a region within a captured image indicative of a red-eye phenomenon, said detection being based upon a comparison of said captured image and a reference image of nominally the same scene taken without flash, wherein the reference image is a preview image of lower pixel resolution than the captured image, the filter including means for matching the pixel resolutions of the captured and reference images by at least one of up-sampling the preview image and sub-sampling the captured image.
2. A system according to claim 1, the filter further including means for aligning at least portions of the captured image and reference image prior to said comparison.
3. A system according to claim 1 or 2, wherein the filter detects said region indicative of a red-eye phenomenon by identifying a region in the captured image at least having a colour indicative of a red-eye phenomenon and comparing said identified region with the corresponding region in the reference image, the filter further designating said region as indicative of a red-eye phenomenon if said corresponding region does not have a colour indicative of a red-eye phenomenon.
4. A system according to claim 3, wherein the decision as to whether a region has a colour indicative of a red-eye phenomenon is determined on a statistical basis as a

global operation on the entire region.

5. A system according to claim 3 or 4, wherein the filter also includes a shape analyser to identify a region in the captured image having both a shape and colour indicative of a redeye phenomenon for subsequent comparison with the corresponding region in the reference image.

10 6. A system according to claim 3 or 4, wherein the filter also includes a shape analyser to determine subsequent to said comparison whether a region designated as indicative of a red-eye phenomenon has a shape indicative of a red-eye phenomenon.

15 7. A system according to any preceding claim, wherein said digital image acquisition system is a digital camera.

20 8. A system according to any one of claims 1 to 6, wherein said digital image acquisition system is a camera is a combination of a digital camera and an external processing device.

25 9. A system as claimed in claim 8, wherein said red-eye filter is located in said external processing device.

30 10. A system according to any preceding claim, further including a pixel modifier for modifying the colour of the pixels within a region indicative of a red-eye phenomenon.